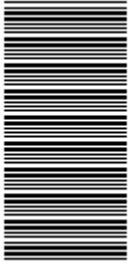


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**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

**FITTING AND TURNING
NQF LEVEL 2**

NOVEMBER EXAMINATION

(6011042)

**30 November 2015 (X-Paper)
09:00–12:00**

Calculators may be used.

This question paper consists of 6 pages and a formula sheet.

TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
 2. Read ALL the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. Write neatly and legibly.
-

QUESTION 1: GRINDING AND SHARPENING

- 1.1 Briefly explain what does *good housekeeping* mean in the workplace? (2)
 - 1.2 State FIVE reasons of 'good housekeeping'? (5)
 - 1.3 Indicate THREE heat treatment processes that are conducted on workpieces in industry. (3)
 - 1.4 Explain the difference between the following terms:
 - 1.4.1 Truing
 - 1.4.2 Dressing(2 x 2) (4)
 - 1.5 Identify THREE main faults that occur with grinding wheels. (3)
 - 1.6 Indicate THREE types of steel that is used to manufacture drills that are used on a drilling machine. (3)
- [20]**

QUESTION 2: DRILLING MACHINES

- 2.1 State FIVE safety measures to be observed when you are using drilling machines in your work shop. (5)
- 2.2 The diagram below shows a sketch of a drill. Write down the letters as indicated in FIGURE 1 in the ANSWER BOOK and correctly label the part next to each letter. (5)

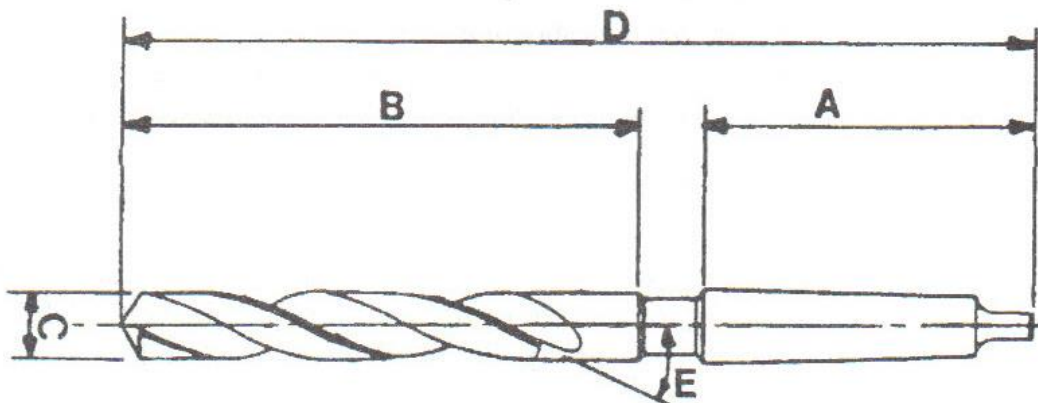


FIGURE 1

- 2.3 Calculate the cutting speed in metres per minute if a 20 mm diameter whole must be drilled into a piece of mild steel at 90 revolutions per minute. (3)
- 2.4 Indicate FIVE types of clamps that are used when drilling on workpieces on a drilling machine. (5)
- 2.5 Identify TWO properties of good cutting oil that is used in industry. (2)
- [20]**

QUESTION 3: HAND THREADING AND REAMING

- 3.1 Explain the following thread terms:
- 3.1.1 Internal thread
 - 3.1.2 Crest
 - 3.1.3 Root
 - 3.1.4 Pitch
- (4 x 2) (8)
- 3.2 Calculate the drill size for a M10 thread with a pitch of 1,5 mm. (2)
- [10]**

QUESTION 4: KEYS AND FASTENERS

- 4.1 Indicate FOUR different types of keys used in practice to prevent rotation between mating parts. (4)
- 4.2 A shaft with a diameter of 36 mm must be provided with a key and keyway to secure a pulley to it.
- Calculate the height (h) and width (w) of the key. (4)
- 4.3 State TWO types of cutters that is used to produce a keyway. (2)
- [10]**

QUESTION 5: CENTRE LATHE

5.1 The diagram below shows a sketch of a centre lathe. Write down the numbers (1–9) as indicated in FIGURE 2 in the ANSWER BOOK and identify the parts next to each number.

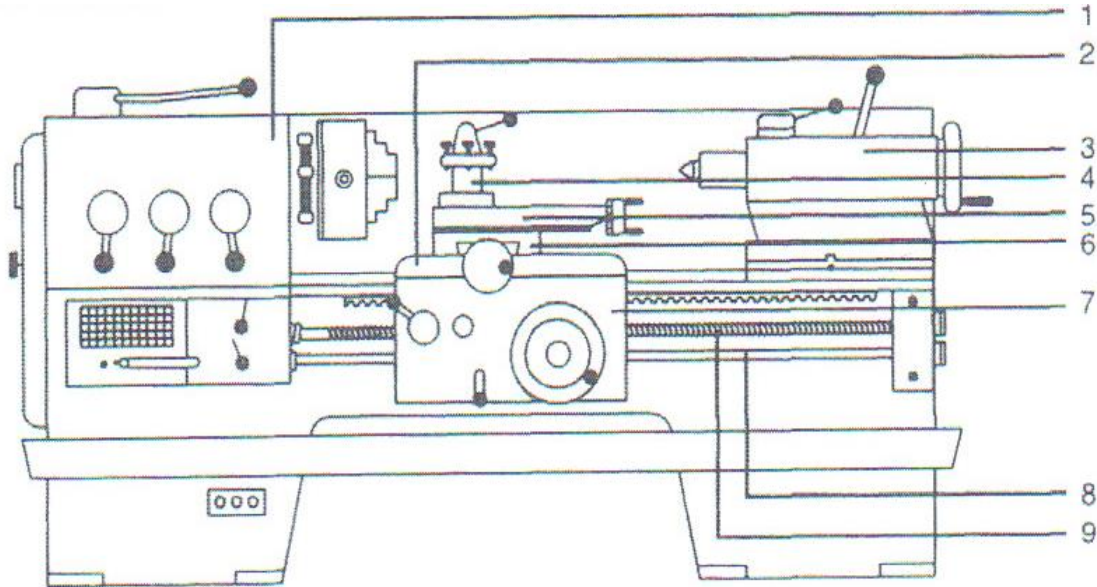


FIGURE 2

(9)

5.2 Indicate TWO advantages and TWO disadvantages of the three-jaw self-centring chuck that is used on a centre lathe to hold workpieces. (4)

5.3 What is the purpose of a mandrel? (1)

5.4 State THREE advantages of a mandrel that is used in your workshop. (3)

5.5 Your fitting workshop lecturer has asked you to machine a brass work piece with the diameter of 50 mm and a spindle speed of 900 rpm.

What speed in m/min will you use to cut your workpiece?

(3)

[20]

QUESTION 6: MILLING MACHINE

- 6.1 Identify FIVE main uses of a milling machine. (5)
- 6.2 State THREE safety precautions applicable when working on milling machines. (3)
- 6.3 Indicate FOUR types of milling machine that are available in industry. (4)
- 6.4 A milling cutter is 25 mm in diameter and has four teeth. The cutting speed for the material is given as 24 m/min and a feed of 0,051 mm per tooth.
Calculate the feed in mm/min. (6)
- 6.5 Identify TWO types of collets that are used on a milling machine to hold a cutter. (2)

[20]**TOTAL: 100**

FORMULA SHEET

FITTING AND TURNING L2

1. $S = \pi \times D \times N$

2. $f = f_t \times T \times N$

3. $w = \frac{D}{4}$

4. $h = \frac{D}{6}$

5. tap drill size = major diameter – pitch